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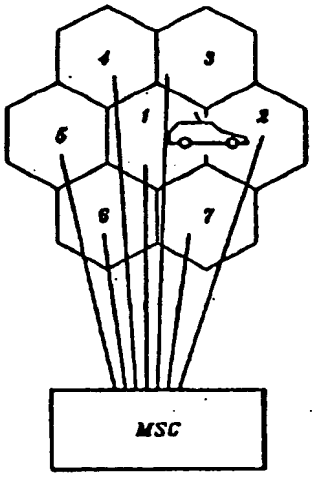
[54]发明名称 一种在移动无线电通信系统中越区切换的方法

[57]摘要

本发明涉及在移动无线电通信系统中有关从第一个基地台（1）切换的方法，其中，移动台测量来自围绕着该移动台的一组基地台（1-7）的信号强度。当要考虑激发切换时，使实测信号强度所形成的信号强度矢量与所存储的、与第一个基地台（1）有关的特征信号强度矢量相关。如果实侧信号强度矢量与所存储的特征信号强度矢量之一间的相关性超过预定相关度，则指示切换到预定的第二个基地台（2-7），或中断切换过程，并且，保持移动台与第一个基地台（1）之间的联系。



权利要求书

1.一种用于在蜂窝状移动通信中从第一基地台切换的方法，由移动服务交换中心测量用来描述移动台和移动台周围的一组基地台之间的信号的信号参数并作出切换断定，其步骤包括：

(a) 当考虑要激发切换时，根据所述实测的信号参数计算一个信号参数矢量，该矢量表征在所述第一基站相应的小区内的所述移动台的地理位置；

(b) 对所述信号参数矢量与一组与所述第一基地台相应的存储的特征信号参数矢量的各矢量进行相关，所述各特征信号参数矢量表征在所述小区中的一个预定位置；及

(c) 当所述在上述测量的信号参数与上述存储的特征信号参数矢量之间相关超过预定相关度时，向所述移动台被指定除了第二基地台以外的一个基地台，此第二基地台有最好的测量信号参数.

2.如权利要求 1 所述的方法，其特征在于：其中所述信号参数包括在移动台处测量的、从一组基地台发射的信号的信号强度中的至少一个信号强度.

3.根据权利要求 1 或 2 的方法，其特征在于：所述信号参数至少包括下列之一：

—至少从一组基地台之一所发射的信号的比特误差率 (BER)；

—至少从一组基地台之一所发射的信号的时间漂移 (TD)；以及

—至少从一组基地台之一所发射的载波信号强度与干扰信号之间的比值.

4.根据权利要求 1 所述的方法，其特征在于：所述信号参数包括在基地台处测量的、由所述移动台发射的一组信号的信号强度中的至少一个信号强度.

5.根据权利要求 4 的方法，其特征在于，所述信号参数至少包括下列之一：

—当至少在一组基地台之一处测量时，所述移动台所发射信号的比特误差率；

—当至少在一组基地台之一处测量时，所述移动台所发射信号的时间漂移；以及

—当至少在一组基地台之一处测量时，所述移动台所发射载波信号强度与干扰信号之间的比值.

6.根据权利要求 2 至 5 中任意一项权利要求的方法，其特征在于：在步骤中，指示切换到在实测信号参数矢量中那个具有可以接受的、但不是最大信号强度的基地台.

7.根据权利要求 1 的方法，其特征在于：与所述第一个基地台 (1) 有关的、所述特征信号参数矢量存储到做出切换判定装置中.

8.根据权利要求 7 的方法，其特征在于：所述特征信号参数矢量作为记录存储在数据外存储器中，该数据外存储器中，每一项记录包括：具有基地台标志码的数据字段；以及与该基地台有关的特征信号参数矢量的信号参数数据字段.

9.根据权利要求 7 的方法，其特征在于：进行切换判定的所述单元存储着连接到所述单元上的所有基地台的特征信号参数矢量.

10.根据权利要求 1 用于切换的方法，其特征在于：对某些存储的特征信号参数矢量所述的切换被中断并将所述移动台保持指定给所述第一基地站.

11.根据权利要求 1 的用于切换的方法，其特征在于：当所述相关不超过一个预定的相关度时，所述移动台被指定给所述第二基地站.

12.根据权利要求 1 的用于切换的方法，其特征在于：所述移动台被指定给一个预定的基地台.

本发明涉及一种在移动无线电通信系统中有关从某一个基地台越区切换 (以下简称切换) 的方法.

在例如移动电话系统的移动无线电通信系统中，移动台与位于该移动台周围的一组基地台之一进行无线电联系.当移动台移动以后，来自当前基地台的信号强度减弱时，执行所谓从一组基地台到另一个基地台的切换.一般来说，在该组基地台于寻呼时对移动台具有最高信号强度时会发生切换.但是，这种方法有时导致对基地台的非最佳选择.在某些环境下，于那一组基地台中选择在移动台处具有足够高信号强度的另一个基地台更为有利.

本发明的目的是，提供一种在移动无线电通信系统中有关从第一个基地台切换的方法，在这种方法中，对于描述在移动台与位于所述移动台周围的一组基地台之间信号的各个信号参数进行测量，并

且把这些参数用于切换判定.

根据本发明的方法，其特征在于:

(a) 当考虑要激发切换时，由实测信号参数所形成的信号参数矢量与所存储的、与所述第一个基地台有关的特征信号参数矢量相关；以及

(b) 如果在所述实测信号参数矢量与所存储的特征信号参数矢量之一之间的相关性超过了预定的相关度，则:

(b1) 指示切换到所述组中预定的第二个基地台，或者

(b2) 中断切换过程，并且，保持移动台与所述第一个基地台之间的联系.

下面将参考附图，对本发明作更加详细地描述，其中:

图 1 表示出蜂窝状移动电话系统的实施例;

图 2 表示出某一种状态的实例，在该状态下不应该切换到那个具有最强信号的基地台;

图 3 表示出蜂窝状移动电话系统中的一些小区，该移动电话系统的基地台连接到共用的移动服务切换中心上；以及

图 4 示出数据库中用于存储信号强度图表的记录结构.

图 1 示出一个蜂窝状移动电话系统的实施例的结构.这种系统包括若干小区，在这一实施例中，每一个小区包括一个基地台 BS. 为了简化起见，图中只示出了若干个这样的基地台 BS. 基地台 BS 与若干移动台 MS 保持着无线电联系，图中仅表示出了一个移动台 MS. 移动台 MS 一般与其当前所位于的小区内的基地台 BS 保持通信. 当移动台 MS 从一个小区移动到另一个小区时,通信则从某一个小区内的基地台 BS 转交给相邻小区内的基地台 BS. 这一过程称为切换. 在切换期间内，原有的基地台指示移动台 MS 切换到属于新基地台的另一通道上.

图 2 示出某一种状态，在该状态下不应该切换到那个具有最强信号的基地台. 图 2 中，有三个基地台 BS_1-BS_3. 假定移动台在从 A 点通过 B 点到 C 点的途中. 在 A 点，移动台与基地台 BS_1 保持联系. 在 B 点，来自基地台 BS_1 的信号强度已经减弱，以致另一个基地台具有更强的信号，因此，指示进行切换. 因为移动台连续测量来自周围基地台的信号强度，所以，在 B 点已确定出基地台 BS_2

具有最强的信号强度，因此，根据传统的方法指示转移到 B 点的基地台. 接着，当移动台继续移动到 C 点时，来自基地台 BS_2 的信号被建筑物 H 阻挡，以致其信号强度迅速降低. 这必将指示进行新的切换. 在这种情况下，可切换到基地台 BS_3.

这样，在所描述的状态下，在 B 点的切换判定以后，很快在 C 点就出现了新的切换判定. 但是，如果基地台 BS_3 在 B 点的信号强度已经足以与移动台转接通信，在 B 点已经指示转移到基地台 BS_3 (而不是基地台 BS_2)，则是更为合适的.

由于在所描述的实例中公路总是有同样的地理形状，而且，从 A 点只有通过 B 点才能到达 C 点. 所以，考虑建筑物 H 将很快阻挡来自基地台 BS_2 的信号及在 B 点进行的切换判定将是需要的.

本发明基于这样的认识: B 点的地理位置不一定必须以 B 点的地理坐标来表示特征. 表示特征 B 点位置的另一种方法是利用由来自周围各基地台的信号强度所形成的信号强度矢量，该信号强度是在移动台内测量的. 这样，B 点可以利用与基地台 BS_1 有关的特征信号强度矢量来标志. 这种与基地台 BS_1 有关的理由是，只有当移动台沿着 ABC 方向移动时，才出现上面具体描述的状态. 这样，只有当要进行从基地台 BS_1 到另一个基地台的切换时，对于标志移动台的地理位置和该移动台以后可能的运动趋向来说，实测的信号强度矢量才是重要的. 但是，如果移动台沿着相反的方向 CBA 移动，则移动台在 B 点时仍然与基地台 BS_3 保持联系而不需要切换. 只有在以后沿着行程 BA 运动的某一点上，才切换到基地台 BS_1. 因此，使特征信号强度矢量与某一个基地台有关，才是重要的.

下面参考图 3 和图 4，更加详细地描述本发明的实施例.

图 3 表示出一组位于移动台周围的基地台 1—7. 这些基地台连接到移动服务切换中心 MSC 上，一般在移动服务切换中心内进行切换判定. 图 3 中，围绕着移动台的这一组基地台全都连接到同一移动服务切换中心上. 但是，这并不是必要的; 相反地，某些基地台可以连接到一个移动服务切换中心上，与此同时另一些基地台可以连接到其它移动服务切换中心上. 在这种情况下，移动服务切换中心彼此互相通信. 但是，为了简化示于图 3 的情况，将描述一组基地台全都连接到移动服务切换中

心上的情况.

移动服务切换中心 MSC 包括一具有"例外点"的特征信号强度矢量的数据外存储器，该"例外点"可以例如为图 2 中的 B 点．图 4 表示出这种数据外存储器的记录结构．每一项记录包括标志信号强度矢量所属于的那一个基地台的字段 BS，记录中其余字段包括例外点上的信号强度 SS-1-SS-7．这样，连接到移动服务切换中心 MSC 上的每一个基地台，可与若干由数据外存储器中所存储的信号强度矢量所确定的例外点有关．测量出这些信号强度矢量或信号强度图表，此后永久性地存储在数据外存储器中，以便在切换判定时加以考虑．

下面假定，当要切换到基地台 2-7 中之一时，移动台正与图 3 中的基地台 1 保持着联系．进而假定，移动台连续测量周围基地台 1-7 的信号强度，并且，报告给基地台 1，基地台 1 把这些测量值传送给移动服务切换中心 MSC．当移动服务切换中心 MSC 确定在移动台处测量的来自基地台 1-7 的信号强度已经变化到满足切换条件的程度时，就在移动服务切换中心 MSC 内所存储的数据库中对于基地台 2-7 中之一的那一个基地台检索是否包括任何例外点．如果为包括例外点的情况则确定这些信号强度矢量是否都充分相关，也就是是否都充分类似于移动台测量出的最新的信号强度矢量，如果这种相关性足以确认移动台严格地位于曾被测量到特征信号强度矢量的那点上，则切换到基地台 2-7 中的另一个基地台，但不是切换到那个具有最强信号的基地台．但是，被选定的基地台在移动台处必须仍具有可以接受的信号强度．

如果确定基地台 1 与任何例外点都无关，或者在移动台测量出的最新信号强度矢量与基地台 1 的任何特征信号强度矢量并不充分相关，则以传统方式转移到基地台 2-7 中具有是强信号的基地台上．

移动台测量的信号强度矢量与数据外存储器中的特征信号强度矢量之间的相关性可以很容易地实现．例如，通过计算相应矢量分量之间差值的绝对值来形成误差矢量来实现．然后，可以把该计算的误差矢量与所存储的误差矢量相比较．如果计算的误差矢量中有足够多的分量小于所存储的误差矢量中的相应分量，即可认为存在着足够的相关性．所存储的误差矢量对于所有的特征信号强度矢量可以

是共同的，或者，对于每一个特征信号强度矢量可以是唯一的．

在某些状态下，例如来自基地台 1 的信号暂时被建筑物阻挡时，最合适的方法可以是完全中断切换过程，因为根据经验，在很短时间以后，基地台 1 将重新具有可接受的信号强度．

在上述本发明的实施例中，已经描述了与信号强度矢量有关的这种信号强度矢量，它由移动台 MS 报告给基地台 BS，但是，移动台也可以测量和报告所述接收信号的其它参数．这些参数也可能涉及切换判定．这样的参数的实例有：

—至少是从基地台 1-7 中一个基地台所发射的信号的比特误差率 (BER)；

—至少是从基地台 1-7 中一个基地台所发射的信号的时间漂移 TD；以及

—至少从基地台 1-7 中一个基地台所发射的载波信号强度与干扰信号之间的比值$\frac{C}{I}$.

因此，上述本发明实施例的总原则是以信号参数矢量来替代信号强度矢量．如果用移动台测量信号参数矢量，并且把该矢量与所存储的特征信号参数矢量相比较，则仍可使用上述原则．

在实施例中除了信号强度以外，还考虑了其它参数，在例外点上毕竟能够指示切换到那个具有最强信号的基地台．会发生这种情况，即除了最强的基地台的参数以外，其余这些基地台的参数并不具备可接受的值．

在上述本发明实施例中，为了简化起见，已经假定在移动台测量信号参数，并且报告给基地台，但是，这不是必要的．一种等效的获得信号参数的方法是，诸如通过对各个基地台的测量，来描述由移动台发射、被相应基地台接收的信号的参数．然后，每一个基地台把这些参数报告给进行切换判定的单元，例如移动服务切换中心．这些信号参数也形成具有移动台地理位置特征的信号参数矢量．

在这样的实施例中，信号参数可以包括在基地台 1-7 处测量的、由移动台 MS 发射的一组信号的信号强度中的至少一个．

在这一实施例中，信号参数的其它实例至少包括下列之一：

—当在一组基地台 1-7 中至少一个基地台处测量时，移动台 MS 所发射信号的比特误差率 (BER)；

—当在一组基地台 1–7 中至少一个基地台处测量时，移动台 MS 所发射信号的时间漂移；以及

—当在一组基地台 1–7 中至少一个基地台处测量时，移动台 MS 所发射的载波信号强度与干扰信号之间的比值 $\frac{C}{I}$。

这样，根据本发明能够提供一种更加不同的用于转移的条件，这种转移条件背离在某些状态下转移到具有最强信号基地台的那种切换条件，使某一个预定的基地台发生切换；或者，继续与原有基地台保持联系，一直到要求下一个切换时。

说 明 书 附 图 CPEL 9150)2

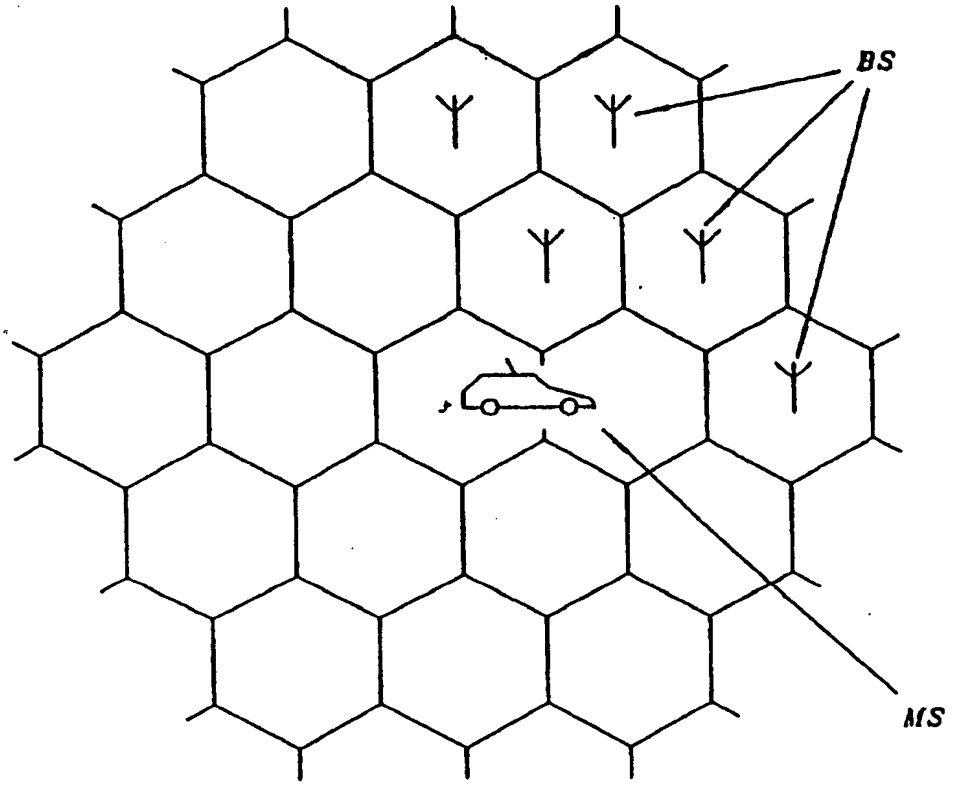


图 1

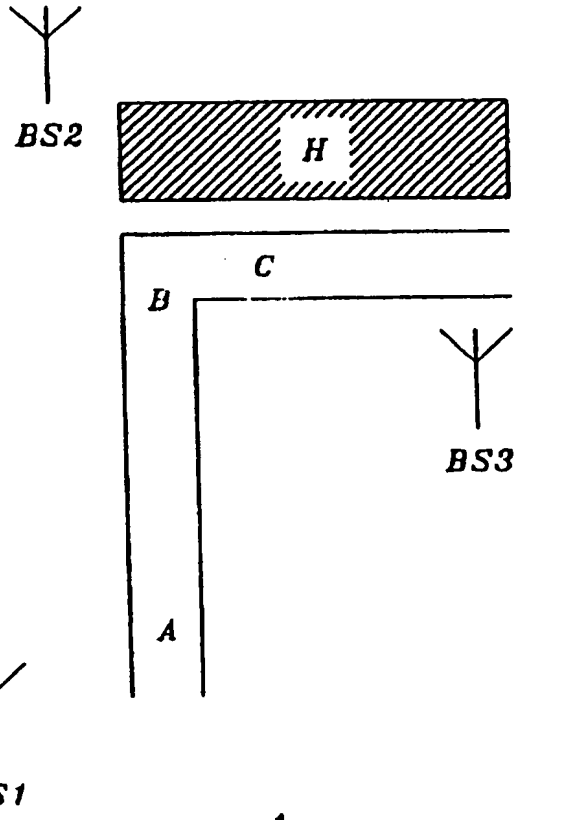


图 2

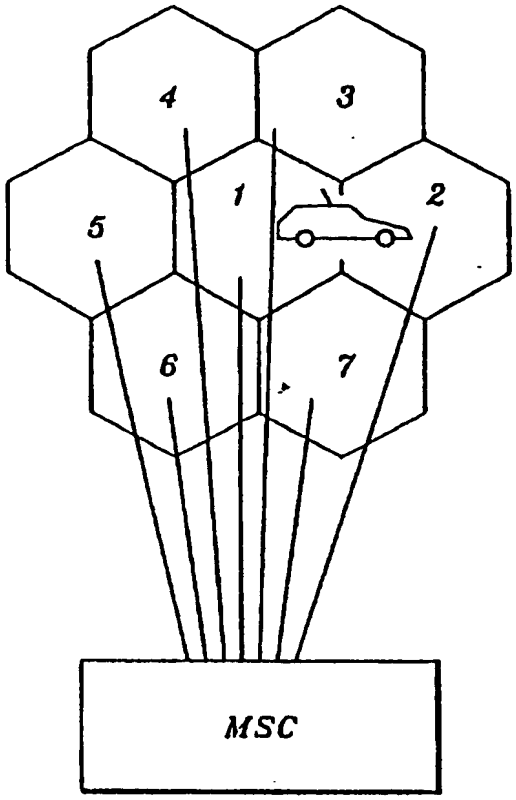


图 3

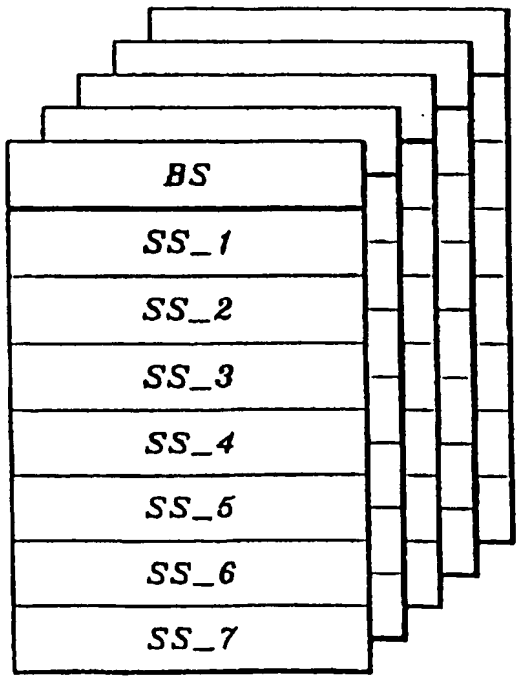


图 4

1991-02-01

Applicant: Telefonaktiebolaget LM Ericsson
126 25 STOCKHOLM

Title: A method for handoff in a mobile radio communication system

English Version of Reference Document 1 (CN1027102C

TECHNICAL FIELD

The present invention relates to a method in connection with handoff from a base station in a mobile radio communication system.

PRIOR ART

In mobile radio communication systems, for instance mobile telephony systems, a mobile station is in radio contact with a base station in a set of base stations located around the mobile station. When the signal strength from the current base station is weakened due to movement of the mobile station a so called handoff to another base station in the set is performed. Normally handoff is done to that base station in the set that has the highest signal strength at the mobile station at the moment in question. This method, however, sometimes leads to a non-optimal choice of base station. Under certain circumstances it would be more advantages to chose another base station among the base stations in the set that have sufficiently high signal strength at the mobile station.

DESCRIPTION OF THE INVENTION

An object of the present invention is to provide a method in connection with handoff from the first base station in a mobile radio communication system, in which signal parameters that describe the signals between a mobile station and a set of base stations located around said mobile station are measured and used for handoff decisions.

The method in accordance with the invention is characterized in that,

(a) when handoff is considered to be motivated, the signal parameter vector formed by the measured signal parameters is correlated with stored characteristic signal parameter vectors associated with said first base station, and,

(b) if the correlation between said measured signal parameter vector and one of said stored characteristic signal parameter vectors exceeds a predetermined correlation level,

(b1) handoff is ordered to a predetermined second base station in said set, or

(b2 the handoff procedure is interrupted and the connection between the mobile station and said first base station is maintained.

DESCRIPTION OF THE DRAWING

The invention will be described more in detail below with reference to the accompanying drawings, in which:

Fig. 1 shows an embodiment of a cellular mobile telephony system;

Fig. 2 shows an example of a situation where handoff should not be made to that base station that has the strongest signal;

Fig. 3 shows a number of cells in a cellular mobile telephony system, the base stations of which are connected to a common mobile services switching centre; and

Fig. 4 shows the structure of a record in a data base for storing signal strength patterns.

PREFERRED EMBODIMENT

Figure 1 shows the structure of one embodiment of a cellular mobile telephony system. Such a system comprises a number of cells, each cell in this embodiment comprising one base station BS. To simplify matters only a number of such base stations BS are shown in the figure. The base stations BS are in radio contact with a number of mobile stations MS, of which only one

is shown in the figure. The mobile station MS generally communicates with the base station BS in that cell in which it is currently located. As the mobile station MS travels from cell to cell the communication from the base station BS in one cell is handed over to the base station BS in a neighbouring cell. This procedure is called handoff. During handoff the old base station instructs the mobile station MS to switch to another channel belonging to the new base station.

Figure 2 shows a situation in which handoff should not be made to the base station that has the strongest signal. In Figure 2 there are three base stations BS1-BS3. A mobile station is assumed to be on its way from point A to point C over point B. At point A the mobile station is in contact with base station BS1. At point B the signal strength from base station BS1 has weakened so that another base station has a significantly stronger signal, and therefore handoff is ordered. Since the mobile station continuously measures the signal strength from surrounding base stations, it has been established in point B that base station BS2 has the strongest signal strength, and therefore handoff in accordance with conventional methods is ordered to this base station. As the mobile station then continuous to point C the signal from base station BS2 will be blocked by a building H so that the signal strength rapidly decreases and a new handoff has to be ordered. In this case handoff is made to base station BS3.

Thus, in the described situation a handoff decision in point B is very rapidly followed by a new handoff decision in pint C. However, if base station BS2 already in point B has sufficient signal strength to take over the communication with the mobile station, it would be more suitable to order handoff already at that point to base station BS3 instead of to base station BS2.

Since the road in the described example always has the same geographical form and the point C can be reached from point A only over point B, it would therefore be desirable to somehow consider the fact that the building H soon will block signals

from base station BS2 in connection with the handoff decision in point B.

The present invention is based on the insight that the geographical location of point B does not necessarily have to be characterized by the geographical coordinates of the point. And alternative way of characterizing the location of the point is by a signal strength vector formed by the signal strengths from the surrounding base stations that are measured in the mobile station. Thus, point B can be identified by a characteristic signal strength vector associated with base station BS1. The reason for this association to base station BS1 is that the specifically described situation arises only if the mobile station travels in direction ABC. Thus, only if handoff is to be made from base station BS1 to another base station is the measured signal strength vector of importance for identifying the geographical location and probable later movement of the mobile station. If, however, the mobile station travels in the opposite direction, CBA, the mobile station at point B will still be in contact with base station BS3 without requiring a handoff. Handoff to base station BS1 is made only later somewhere along the distance BA. Thus, it is essential to associate the characteristic signal strength vector with a certain base station.

An embodiment of the invention will be described more in detail below with reference to figures 3 and 4.

Figure 3 shows a set of base stations 1-7 located around a mobile station. These base stations are connected to a mobile services switching centre MSC, in which handoff decisions normally are made. In Figure 3 all the base stations in the set that is surrounding the mobile station are connected to the same mobile services switching centre. However, this is not necessary; instead certain base stations may be connected to one mobile services switching centre while other base stations may be connected to other mobile service switching centres. In such a case the mobile services switching centres communicate with each other. However, to simplify matters the case shown in Figure 3,

where all the base stations in the set are connected to mobile services switching centre MSC will be described.

The mobile services switching centre MSC comprises a data file with characteristic signal strength vectors for "exception points", for instance point B in Figure 2. Figure 4 shows the structure of a record in such a data file. Each record comprises a field BS that identifies a base station to which the signal strength vector belongs. The remaining fields in the record contain signal strengths SS_1 - SS_7 in the exception point. Thus, on demand each base station that is connected to the mobile services switching centre MSC can be associated with a number of exception points defined by signal strength vectors stored in the data file. These signal strength vectors or signal strength patterns are measured and thereafter permanently stored in the data file and can thereafter be considered in connection with handoff decisions.

In the following it is assumed that the mobile station is in contact with base station 1 in Figure 3 when a handoff is to be made to one of the stations 2-7. Furthermore, it is assumed that the mobile station continuously measures and reports signal strengths for surrounding base stations 1-7 to base station 1, which directs these measurement values to the mobile services switching centre MSC. When the mobile services switching centre MSC determines that the signal strengths from base stations 1-7 measured at the mobile station have changed to such levels that the conditions for handoff are fulfilled, it is investigated whether the data base stored in the mobile services switching centre MSC contains any exception points for this base station. If this is the case it is determined whether any of these are sufficiently correlated to, that is sufficiently similar to the latest signal strength vector measured by the mobile station. If the correlation is sufficient to consider the mobile station to lie in exactly the point where the characteristic signal strength vector once has been measured, a handoff is performed to another base station among stations 2-7, but not to that base station that has the strongest signal. However, the chosen base station

must still have acceptable signal strength at the mobile station.

If it is determined that base station 1 is not associated with any exception points or if the last signal strength vector measured at the mobile station is not sufficiently correlated with any of the characteristic signal strength vectors for base station 1, a handoff is performed in a conventional way to that base station 2-7 that has the strongest signal.

The correlation between a signal strength vector measured at the mobile station and a characteristic signal strength vector in the data file can easily be performed for instance by calculating the absolute value of the difference between respective vector components to form a deviation vector. This deviation vector can then be compared to a stored deviation vector. If a sufficient number of components in the calculated deviation vector are smaller than the corresponding components in the stored deviation vector sufficient correlation is assumed to exist. The stored deviation vector can be common for all characteristic signal strength vectors or be unique for each characteristic signal strength vector.

In certain situations, for instance when signals from base station 1 temporarily are blocked by a building, the most suitable procedure can be to completely interrupt the handoff procedure since according to experience base station 1 shortly thereafter will have an acceptable signal strength again.

In the above example the invention has been described in connection with signal strength vectors that are reported by the mobile station MS to the base station BS. However, the mobile station can also measure and report other parameters that describe received signals. These parameters can also be of interest in connection with a handoff decision. Examples of such parameters are:

- the bit error rate (BER) of signals transmitted from at least one of the base station 1-7;

- the time dispersion, TD, of signals transmitted from at least one of the base stations 1-7; and

- the ratio, C/I, between the signal strength of the carrier that has been transmitted from at least one of the base stations 1-7 and interfering signals.

A generalisation of the described embodiment of the invention is therefore to replace the signal strength vector with a signal parameter vector. The principals described above can then still be used if the mobile station instead measures the signal parameter vector and this vector is compared to stored characteristic signal parameter vectors.

In an embodiment where also other parameters than signal strength are considered it is possible that handoff in an exception point is ordered to that base station that has the strongest signal after all. It can for instance happen that these further parameters do not have acceptable values for any other than the strongest base station.

In the described embodiment of the invention to simplify matters it has been assumed that signal parameters are measured in the mobile station and reported to a base station. However, this is not necessary. An equivalent way to obtain signal parameters is for instance to let the base station measure parameters that describe the signal that is transmitted by the mobile station and received by the respective base stations. These parameters can then by each base station be reported to the unit that makes handoff decisions, for instance a mobile services switching centre. These signal parameters also form a signal parameter vector that characterizes the geographic location of the mobile station.

The signal parameters in such an embodiment can comprise at least one of the signal strengths measured at the base stations 1-7 in the set of a signal transmitted by the mobile station MS.

Further examples of signal parameters in this embodiment can comprise at least one of:

- the bit error rate, BER, of a signal transmitted by the mobile station MS as measured at at least one base station 1-7 in the set;

- the time dispersion, TD, of a signal transmitted by the mobile station MS as measured at at least one base station 1-7 in the set;

- the ratio, C/I, between the signal strength of the carrier transmitted by the mobile station MS and interfering signals as measured at at least one base station 1-7 in the set.

Thus, with the present invention it is possible to provide more differentiated conditions for handoff, that is to deviate from the condition that handoff is to be made to the base station that has the strongest signal in certain situations. Instead handoff can be made to some other predetermined base station or the connection with the original base station can be maintained until the next handoff request.

The man skilled in the art appreciates that different changes and modifications of the invention are possible without deviation from the scope of the invention, which is defined by the appended patent claims.

C L A I M S

1. A method for handoff from a first base station (1) in a mobile radio communication system, in which signal parameters that describe signals between a mobile station (MS) and a set of base stations (1-7) surrounding this mobile station are measured and used for handoff decisions,

c h a r a c t e r i z e d in that,

(a) when handoff is considered to be motivated, the signal parameter vector formed by the measured signal parameters is correlated with stored characteristic signal parameter vectors (SS_1, ..., SS_7) associated with said first base station (1), and,

(b) if the correlation between the measured signal parameter vector and one of said stored characteristic signal parameter vectors (SS_1. ..., SS_7) exceeds a predetermined correlation level,

(b1) handoff is ordered to a predetermined second base station (2-7) in said set, or

(b2) the handoff procedure is interrupted and the connection between the mobile station (MS) and said first base station (1) is maintained.

2. The method of claim 1, c h a r a c t e r i z e d in that the signal parameters comprise at least one of the signal strengths (SS_1 - SS_7) of signals transmitted from the base stations (1-7) in the set as measured at the mobile station (MS).

3. The method of claim 1 or 2, c h a r a c t e r i z e d in that said signal parameters comprise at least one of:

- the bit error rate (BER) of signals transmitted from at least one base station (1-7) in the set;

- the time dispersion (TD) of signals transmitted from at least one base station (1-7) in the set; and

- the ratio (C/I) between the signal strength of the carrier that has been transmitted from at least one base station (1-7) in the set and interfering signals.

4. The method of claim 1, c h a r a c t e r i z e d in that said signal parameters comprise at least one of the signal strengths measured at the base stations (1-7) in the set of a signal transmitted by said mobile station (MS).

5. The method of claim 1 or 4, c h a r a c t e r i z e d in that said signal parameters comprise at least one of:

- the bit error rate (BER) of a signal transmitted by said mobile station (MS) as measured at at least one base station (1-7) in the set;

- the time dispersion (TD) of a signal transmitted by said mobile station (MS) as measured at at least one base station (1-7) in the set; and

- the ratio (C/I) between the signal strength of the carrier transmitted by said mobile station (MS) and interfering signals as measured at at least one base station (1-7) in the set.

6. The method of any of claims 2 - 5, c h a r a c t e r i z e d in that handoff in step (b) is ordered to a base station (2-7) having an acceptable but not the highest signal strength in the measured signal parameter vector.

7. The method of any of the preceding claims, c h a r a c t e r i z e d in that said characteristic signal parameter vectors (SS_1, ..., SS_7) that are associated with said first base station (1) are stored in the unit (MSC) that makes handoff decisions.

8. The method of claim 7, c h a r a c t e r i z e d in that said characteristic signal parameter vectors (SS_1, ..., SS_7) are stored as records in a data file, in which each record comprises a data field with an identification code for a base station and data fields for signal parameters of characteristic signal parameter vectors associated with this base station.

9. The method of claim 7, c h a r a c t e r i z e d in that said unit (MSC) making handoff decisions stores characteristic signal parameter vectors for all the base stations that are connected to said unit.

A B S T R A C T

The invention relates to a method in connection with handoff from a first base station (1) in a mobile radio communication system, in which method the signal strengths from a set of base stations (1) surrounding a mobile station are measured in the latter. When handoff is considered to be motivated, the signal strength vector formed by the measured signal strengths is correlated with stored characteristic signal strength vectors associated with the first base station (1). If the correlation between measured signal strength vector and one of said stored characteristic signal strength vectors exceeds a predetermined correlation level, handoff is commanded to a predetermined second base station (2-7) in the set having acceptable but not the highest signal strength in the measured signal strength vector, or is the handoff procedure interrupted and the connection between the mobile station and the first base station (1) maintained.

(Fig. 3)